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5 June 1959

MEMORANDUM FOR: Deputy Director (Plans) 25X1D

SUBJECT : [redacted]

REFERENCES : a. Memo for the Record, Subject: "Follow-on Operational Considerations" (25 May 59)

b. Memo for the Record, Subject: "Follow-on Evaluation Criteria" (25 May 59)

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25X1D [redacted] The Convair Super Hustler and the Lockheed A-11. A brief description of these two aircraft is as follows:

a. The Convair Super Hustler is a manned parasite photo vehicle which is transported by a modified B-58 aircraft. It is a very high performance delta wing aircraft utilizing two ramjet engines. A small turbojet engine is provided for let-down and landing. This aircraft does not have the capability of taking off from a runway and must be launched at high speeds and high altitudes. Provisions have been made for landing on a runway by using a nose wheel and tail skids. The B-58 (mother ship) is a four engine delta wing bomber. This aircraft is modified for the purpose of carrying the parasite. The B-58 can be conventionally refueled in flight.

b. The Lockheed A-11 is a very high performance twin turbojet delta wing aircraft which operates from an airbase in a conventional manner. This aircraft is designed for conventional in-flight refueling.

2. Operational Capabilities:

The following are statistics comparing the two aircraft:

a. Performance:

(1) The Super Hustler is a Mach 4.0 aircraft that has a self contained range of 4,150 nm. This aircraft would operate at an altitude of 90,000 feet over denied areas.

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(2) The Lockheed A-11 is a Mach 3.2 aircraft with a self contained range of 4,000 nm. This aircraft would make penetration at 88,700 feet and climb to the primary target area being over the target at [redacted]

b. Range - the above paragraph spelled out the self contained range for the two aircraft. In actual operation the range of the two aircraft would be figured as follows:

(1) Super Hustler as a parasite would be carried in a B-58 which could be refueled any number of times prior to reaching the point of penetration. Assuming that the B-58 would launch the parasite approximately 200 nm prior to penetration, the useable range over the target area would be in the neighborhood of 3,500 nm. This would allow 500 miles after withdrawal to proceed to selected air base.

(2) The A-11 as pointed out in the above paragraph has a self contained 4,000 nm range; however, this aircraft is designed for air refueling and the range would be limited only by the pilot fatigue, oxygen, and oil supply factors. It is believed that three air refuelings would be maximum for any one mission. This would give this aircraft a range of 17,446 nm. Due to flying safety requirements, the pre-selected refuel points would normally be located fairly close to an adequate Air Force base which could be used for landing in event of an emergency. This safety factor would limit the actual useable range over the target area to approximately 3,500 nm.

In comparing the actual useable range in these two aircraft, they are about equal.

c. Employment

(1) In operation the Super Hustler has two prerequisites: A B-58 mother ship and a retrieve base. It is probable that in actual operation a staging base would also be required.

(2) The Lockheed A-11, assuming two or three air refuelings to be practical, would require no overseas bases for conducting operational missions. This aircraft could take off from the ZI and be refueled prior to point of penetration and refueled again upon withdrawal and returned to home base in the ZI.

d. Other factors bearing on operational comparison:

(1) Radar immunity - This is considered in the design of the Super Hustler, but it has not been considered in the design of the A-11.

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(4) The turn around time of the Super Hustler is estimated to be 8 to 12 hours and for the A-11 is estimated to be 3 - 4 hours.

(5) Single engine performance of the Super Hustler is very limited while the A-11 single engine performance is excellent. The aircraft is capable of taking off on one engine and at altitude can maintain a Mach 3.2 speed at 72,000 feet.

(6) The tire loadings of both aircraft are considered to be within limits.

(7) Availability - It is estimated that the Super Hustler would be available in approximately 24 - 30 months. The A-11 would be available in 18 - 24 months.

(8) Navigation Systems - Both aircraft will use the inertial guidance system.

(9) Fatigue Factors - It is difficult to pin down the fatigue factors for these two aircraft; however, it is the opinion of Operations that the Super Hustler would probably be more comfortable due to the utilization of the capsule concept. Capsule concept in itself is not necessarily less fatiguing. Pressure suit may still be required for loss canopy, etc. Probably less fatigue since SR is carried for all of mission except penetration run, pilot has to fly only two hours. The fatigue factors of the A-11 would be within limits assuming not more than 3 refuelings were made. This would mean that the operational mission flights would be of approximately the same duration as the present U-2 flights.

(10) Escape systems - The Super Hustler incorporates a capsule escape system which is considered feasible and desirable. The escape system planned for the A-11 will meet the minimum acceptance USAF standards.

(11) Payload capacity - Both these aircraft have the capability of carrying 900 pounds payload. SH has more payload areas but does not mean more versatile. Spaces are small and desired camera installation cannot be made. A-11 has adequate space for Schmidt camera system desired by P & E.

3. Logistics:

a. Ground Handling Equipment:

(1) B-58 - Super Hustler:

(a) As the Super Hustler may be skid mounted, special ground handling dollies will have to be procured for the home base and all staging areas.

(b) In addition to the normal base ground handling equipment, special aircraft and engine hoisting slings will be needed.

(c) Due to the highly complex electronic equipment installed in the B-58, special test equipment will have to be provided at both the home base and staging areas.

(d) The B-58 also employs liquid oxygen. The peculiarities of personnel, equipment and operating conditions involved in generating, storing and dispensing liquid oxygen presents a major logistics problem. Units will have to be located at the home base and staging bases.

(e) Three different types of engine build-up and transportation dollies will have to be provided.

(f) Depending upon the type of loading required, a pit-type loading ramp may be required in fitting the parasite to the B-52.

(2) A-11:

Normal base ground handling equipment such as compressors, tow vehicles, generator units, etc., can be utilized on this aircraft with the exception of two bars, aircraft and engine hoisting slings and engine transportation dollies which vary with each aircraft. The A-11 would need maintenance personnel normally only at its home base.

b. Maintenance:

(1) Inasmuch as the B-58 and parasite would require a recovery base, maintenance personnel at both the home base and the recovery base would have to be manned. The home base manned for complete maintenance, i. e., organizational and field maintenance and the recovery base with organizational maintenance augmented by a field maintenance team from the home base when required. Total handling equipment as stated above would be needed both at the home base and the recovery base.

(2) Due to the high complex systems on the B-58 aircraft, a high percentage of the maintenance personnel will be skilled contractual Technical Representatives rather than the regular mechanic type.

c. Supply:

(1) B-58 - Super Hustler:

Due to two aircraft, logistical supply for support and fly-away kit must be provided at both the home station and staging bases. The number of personnel will be four times that required for supply for the A-11.

(2) Engines:

The Super Hustler—B-58 employs three types of engines totaling seven (7) installed from three different contractors, whereas the A-11 uses one type engine with a total of two (2) engines installed and only utilizing one contractor.

(3) Fuel:

Both systems will require two (2) types of fuel, Boron type and JP-130.

d. Additional Operating Costs:

(1) Air refueling operations would utilize KC-135 tanker supplied by the Air Force. (The B-58 would require one type fuel—the A-11 would require two types fuel)

(2) Air Carrier:

The Super Hustler would require C-130/C-124, air lift for staging as well as retrieving, whereas the A-11 would only require personnel deployment in emergencies as requirements dictate.

e. Estimate of Base Facilities Required:

(1) Super Hustler - B-58

(a) Two hangars 200' x 200' with additional area for shop and office space.

(b) Concrete runway 10,000' long with turn-arounds capable of sustaining B-58 operations. (Aprons, taxi ways, etc.)

(c) Fuel storage and pumping necessary for two types of fuel.

(d) Pit or Ramp for loading purposite.

(e) Mess and housing for approx. 1248 people.

(2) Atoll:

(a) Two hangars 200' x 200' with adequate area for shop and office.

(b) Concrete runway 9000' long capable of sustained twin jet operations, with adequate taxi ways and aprons, etc.

(c) Fuel storage for two types of fuel.

(d) Mess and housing for (280) people.

f. Personnel Requirements and Estimate of Maintenance Required:

(1) The following requirements for maintenance personnel based on Air Force Manual 26-1, 400-5 and the B-58 Weapons System Summary are as follows:

(a)	B-2	5760 flying hours	140 man-x
(b)	A-11	5760 flying hours	280 man
(c)	B-58	5760 flying hours	825 man
(d)	Super Hustler	1800 flying hours	420 man-xx

x - Based on data received from Air Force Weapons Project Officers Report.

xx - Based on figures for F-102A aircraft.

(2) The figures above on the A-11 are estimated at double that of the B-2 due to the added engine and advance design.

(3) Based on known factors on hand, overall estimate is that it will require five times as many personnel to perform the maintenance and logistics on the B-58--Super Hustler weapon system over that of the A-11 weapons systems.

g. Organization required to support initial operations of [redacted] weapons:

(1) Super Hustler:

(a) One AF squadron of minimum ten B-58 aircraft complete with pilots, mechanics, and all staff, maintenance and logistics for support.

(b) Comparable civilian unit plus adequate staff for operations, staging, and retrieve.

(c) KC-135 tankers service provided by SAC.

(d) Two C-130/C-124 and crews available for retrieve.

(2) A-11:

(a) Civilian unit complete with operations staff, pilots, mechanics, and all maintenance and logistics for support.

(b) KC-135 tanker service provided by SAC.

h. Initial Costs:

(1) Super Hustler:

ITEM	COST
(a) Design Eng., testing Prototype, Mockup (b) Engines	(included in figure below)
(c) Production (per unit)	[redacted]
[redacted] (10 aft) * B-58 modification	

* Note: Does not include cost of B-58

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4. Time Factors:

(1) Super Hustler:

ITEM	TIME PERIOD:
(a) Design & Engineering:	
(1) Airframe	24-30 months
(2) Engines	Ramjets in 24 - 36 months
(b) Production	*18 units - 36 months
(c) Training Period	For 8 pilots: 6 months
(d) Turn around time	8 - 12 hours. Depending on retrieve.

* For the Super Hustler parasite availability of B-52's will have to be considered.

(2) A-11:

ITEM	TIME PERIOD:
(a) Design & Engineering:	
(1) Airframe	18 - 22 months
(2) Engines (J-58)	Running on test beds at present time.
(b) Production	12 units - 24 months
(c) Training Period	For 8 pilots: 3 months for comparable proficiency
(d) Turn around time	3 - 4 hours

4. Conclusions:

a. Both aircraft (the Super Hustler and the A-11) have the capability of covering all targets within the USSR to include the satellite countries and Red China.

b. Both aircraft are considered equal insofar as range and altitude are concerned. The Super Hustler is probably a little better insofar as detection by radar is concerned. However, there is more

probability of detection due to infra-red. Both aircraft are approximately equal insofar as sonic boom detection is concerned. The Super Hustler is probably less vulnerable for intercept due to the fact that it is approximately 400 knots faster than the A-11.

e. For overall operational security, the A-11 is considered to be far superior to the Super Hustler weapons system. This operational security is due mainly to the ZI base concept for pre and post strike. On the other hand, the B-58 mother ship, due to its very nature of being a first line atomic weapon, makes the Super Hustler weapons system an almost insurmountable security problem.

d. The maintenance requirements for the two weapons systems indicate that the A-11 is a much easier and much more economical system to maintain.

e. The overall cost of procurement of the A-11 weapons system is far less than the cost of the Super Hustler weapons system.

f. The personnel requirements for conducting operations with the A-11 are far less than that required with the Super Hustler. A rough estimate of manpower required to conduct the same number of sorties indicates that approximately eight times as many trained people would be needed for the Super Hustler.

5. Recommendations: Based on the evaluation of the two weapons systems and the above conclusions, it is recommended that the Lockheed A-11 weapons system be selected as the follow-on aircraft to be used to meet CHALICE operational requirements.

SIGNED
WILLIAM BURKE
Colonel, USAF
Acting Chief, DPD
DD/P

Attachments (4):
1. Follow-On Opl. Considerations
2. Follow-On Evaluation Criteria
3. Map - Super Hustler
4. Map - A-11

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Recommendations in para 5 APPROVED:

RICHARD M. BISSELL, JR.
Deputy Director
(Plans)

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